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OCTOBER, 1929

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Vol. XL No. 8

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CONTENTS

Gunder—North American Institutions Featuring Lepidoptera—VII. . . 245
Hebard—A Remarkable New Chilean Genus of Grasshopper (Orthoptera, Crytacanthacrinae) 253
Rau—Orphan Nests of Polistes (Hym.: Vespidae). 256
Balduf—Hibernation of the Striped Cucumber Beetle (Coleop.: Chrysomelidae). 260
Knight—The Fourth Paper on New Species of Plagiognathus (Hemiptera: Miridae) 263
Harris—An Unusual CatocalaColony (Lepid.: Noctuidae). 269
Knull—Three New Species of Agrilus (Coleop.: Burprestidae). 270
Mora—A Swarm of Dragonflies in Costa Rica (Odonata) 273
Tristán— " " " " " " " " 273
Entomological Literature. 274

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DR. WM. BARNES

ENTOMOLOGICAL NEWS

VOL. XL. OCTOBER, 1929 No. 8

North American Institutions Featuring Lepidoptera. VII. Barnes Museum of Lepidoptera, Decatur, Illinois.

By J. D. GUNDER, Pasadena, California.

(Plates XII, XIII, XIV.)

Dr. William Barnes of Decatur, Illinois, has the largest collection of North American lepidoptera in existence and it can also be said that he has accomplished more general taxonomic work in the order[1] than any other living man. There is no doubt that the best work in lepidoptera is always done by those having adequate material and that the poorest is offered by those whose collections cannot back up their observations. "Get long series from the type localities and you will know what you are doing" has been the Doctor's motto and objective. Perhaps this is one of the reasons why in the last few years he is looked upon as the American authority.

Decatur is a prosperous town of some seventy thousand inhabitants in the central part of the State of Illinois and Dr. Barnes has always lived in this community. His people are old settlers and owned hundreds of acres of some of the best agriculture lands in the district. Born September 3, 1860, he graduated in 1877 from the Decatur High School and later in 1883 from Harvard University. Following in his father's footsteps as a physician, he graduated from the Harvard Medical School in 1886 and has since specialized in surgery, being one of the founders of the great Decatur and Macon County Hospital at Decatur and one of the best known surgeons in the state. He was married to Charlotte Lancraft Gillett at Elkhart, Illinois, on June 18, 1891. A married son, Wm. Barnes, Jr., and a married daughter, Joan Gillett McArthur, live in or near Decatur and the old gentleman is a very happy grandparent indeed

[1] Strictly Boreal American, north of old Mexico.

THE AMERICAN ENTOMOLOGICAL SOCIETY

when all the youngsters happen to gather around the house or in his entomological work rooms. Doctor is a stanch Republican and does not care much about the blue-law church people. He is broad shouldered and athletic despite his years. His conversation and letters are always to the point and he has a pleasing definiteness of character which is appreciated by his entomological friends and others. Whenever there is a Community Chest, a new baseball field or some other civic event to "put over", Bill Barnes is called upon to take charge, for they know he can make a success of almost any undertaking.

"No one in particular first interested me in lepidoptera, as far as I can remember", says Dr. Barnes, "but when I was ten or twelve years old, I used to pin butterfly specimens on wooden strips and tack these on the wall in my room. A little later I kept them in segar boxes and still later in wooden boxes which I made myself. About this time I caught a transition form (aberration) of *Pyhciodes tharos* (Dru) which I sent to the Museum of Comparative Zoology in Boston and I suppose it is still there. While a student at Harvard, I knew Oliver Wendell Holmes and Louis Agassiz. It may be it was these gentlemen who fired my zeal to seriously continue entomology and eventually make some contribution to the science".

For many years Dr. Barnes kept his collection in several rooms in his residence, but as these became too small and the destruction hazard for types too great, a special detached building was put up on the rear of his lot. This unique structure cost upward of twelve thousand dollars and is partly shown in the circle at the top of plate XII. It is isolated, fire-proof, forty feet long, thirty feet wide and fourteen feet high and built of hollow tile, steel and concrete. To insure against dampness the walls have two air spaces. An interesting feature is the cement floor, which is heated from beneath. To provide abundant light there are three plate-glass windows along one side, each fifty-two inches wide. On plate XII Dr. Barnes is shown sitting at his desk before one of these windows. Additional light is afforded by three large sky-lights in the ceiling, sloping

to the north. All electric wiring is in conduit and plenty of adjustable drop cords furnish illumination on cloudy days.

Regarding the collection. Altogether there are 42 oak cabinets of nearly uniform size containing 1232 drawers. These are arranged in parallel rows, double-decked, down the center of the room. (See illustration showing one of three aisleways.) The drawers are double walled for insecticide with triple-ply bottoms and have plate glass tops. They average 20 x 24 inches in size. These drawers hold the real mounted collection and contain upwards of 35,000 butterflies and 170,000 moths. These specimens are all well mounted and labeled and as stated before are all of strictly United States and Canadian origin. Duplicates and not-worked-up specimens are kept in 2160 Schmidt boxes on shelves along one side of the room. (These can be seen in the background on the large plate XIII.) It is estimated that these boxes contain from 250,000 to 260,000 reserve specimens, enough to make four or five complete collections. From this stock the "exchange" or "trade" wants are taken. Summed up, the Barnes Collection may be estimated to contain about 465,000 specimens, a figure which cannot be far from wrong.

Regarding the type material. There are 1915 straight types, 1078 co- or paratypes and 3714 homo-types, totaling 6707 examples. Each of these represents a different name in the checklist, i. e., species, race, form, transition form or synonym as the case may be. In addition to these there are, of course, quite a few other types such as paratypes, etc. When the Guenée Collection is carefully worked up, probably there will be found a few more labeled type specimens. All types are kept in the general collection and not segregated. One style of type label has always been used by Dr. Barnes. Types of the following authors are included in the collection: Barnes, Barnes & Busck, Barnes (& curators), Benjamin, Beutenmüller, Biedermann, Bird, Blackmore, Boisduval, Boisduval & LeConte, Braun, Brehm, Busck, Cassino, Cassino & Sweet, Comstock, Curtis, Dod, Dyar, Ehrman, Ellsworth, Engel, Engelhardt, Fletcher, French, Graef, Grinnell, Grossbeck, Grote, Guenée, Guerin,

Gunder, Heinrich, Herrich-Schäffer, Heylaerts, Hill, Holland, Hulst, Kerfott, Leussler, Lindsey, Lyman, McDunnough, Morrison, Murtfeldt, Nakahara, Nixon, Newcomb, Oberthür, Ottolengui, Owen, Pearsall, Poling, Putnam-Cramer, Ragonot, Reiff, Smith, Sweet, Taylor, Verity, Worthington, Wright.

The following collections of lepidoptera have been purchased by Dr. Barnes and incorporated into his collection:—

Oberthür Collection. All North American specimens excepting the Sphingidae acquired by Clark of Boston and the *Parnassius* and Hesperidae acquired by R. Oberthür. The Boisduval and Guenée collections were previously mixed in with the Oberthür collection. Among others this collection contained the types of certain specimens of Guerin, Curtis, Heylaerts, Ragonot, Verity, Herrich-Schäffer, Oberthür and Boisduval-LeConte.

Taylor Collection. Mostly Geometridae with many types.

Kearfoot Collection. Micro collection complete, excepting the Tortricids. Of these the types went to the New York Musuem, but one-half the specimens, including co-types, when present, went to the Barnes collection.

Poling Collection. Only a few types.

Lacy Collection. A few co-types.

Field Collection. Quite a few co-types.

Hill (Los Angeles) Collection. Noctuidae only. All types and other desired specimens as wanted. Remainder of collection was bought by the Los Angeles Museum of Los Angeles, Calif.

Longley Collection. Only one type.

Spalding (Utah) Collection. No types, but a few co-types.

Merrick Collection. Only one type and a few co-types.

Dr. Barnes considers the three rarest butterflies in his collection to be *Eurymus boothii* Curt., *Cercyonis stenele* Bdv. and *Euphydryas helvia* Scud. and the three rarest moths as probably *Spinx dolli* Neum., *Hemileuca sororius* Hy. Edw. and *Sthenopis auratus* Grt. He still has his "wants", as has every collector and would like to find someone who has *Papilio ammoni*

Behrns[2], or *Eurymus moina* Stkr. among the butterflies and perhaps *Hyphantria aspera* Grt. among the moths.

A system of complete disinfection has been inaugurated for the collection and all drawers and boxes are inspected periodically, usually twice a year. If any signs of infection are found, the drawer or box is fumigated; then a small blue sticker is stuck on so that for a year or more frequent examination may be made until the trouble is ended. Napthalin is used in the drawers and naphalin cones in the duplicate boxes. This has proven quite satisfactory. All in-coming material is kept in an air-tight drum filled with bi-sulphide of carbon for several days. This drum is of good size and will hold several large express shipments at a time.

The Doctor has, of course, a very large entomological library and he has probably received during his lifetime more complimentary authors' "extras" than any other living man. Among his books he considers "Illustrations of North American Entomology", Vol. 3, 1878, by Towend Glover, as very interesting. For years he has been a steady subscriber to over thirty entomological serials, which is quite an item of expense.

Revisional workers and compilers of books on lepidoptera have made valuable use of the Barnes collection. Hardly a month passes without a visit from some one interested scientifically in lepidoptera and Dr. Barnes has been very kind in this regard. Very recently Dr. Holland has borrowed certain specimens to illustrate in his new "Butterfly Book", as the W. H. Edwards collection, though good in its day, did not cover the field by any means. When John Comstock published the "Butterflies of California" a few years ago, much assistance in western identification was afforded and specimens lent for figuring. The collection was liberally drawn on for the original specimens shown in Seitz and the specimens thus used are marked in the collection with the Seitz plate and figure number. After leaving Washington Prof. John B. Smith used the Barnes material extensively on Noctuids. Whenever he had

[2] The Author has two fine examples of this from San Diego County, California, one of which is figured in Comstock's "Butterflies of California". It is probably a larger and darker race of *Papilio rutulus* Luc. coming north from the mountains of western Mexico.

two specimens before him when describing new species, one was deposited in the Barnes collection. If the specimens came originally from this collection, the types were supposed to be returned, but in many cases this was not done and after Smith's death no effort was made to retrieve any of this material.

In the past Dr. Barnes has employed several all-time assistants or curators to continually work over and help build up the collection. Among these were Dr. A. W. Lindsey and Mr. Foster H. Benjamin, whose portraits accompany this article. Dr. Lindsey accomplished a "Revision of the Pterophoidae", etc., and did valuable work on the Hesperidae, in which field he always took an active interest. He is at present with the Denison University at Granville, Ohio, and will shortly publish a textbook on "Evolution". Dr. Lindsey was with Dr. Barnes from April 2, 1919, to August 19, 1921. Recently the popular press has given Mr. Foster H. Benjamin nationwide notice in connection with his Government work fighting the Mediterranean Fruit Fly. At present he is in Orlando, Florida, having come from Brownsville, Texas, after leaving Dr. Barnes in August, 1927. A "Revision of the Rynchagrotis" is one of several of his papers on lepidoptera. Mr. Benjamin has a fine collection of Noctuids, preferring that group among the moths. Dr. Jim McDunnough was Barnes' first assistant, prior to 1919. He is at present with the Canadian Government at Ottawa, and editor of the *Canadian Entomologist*.

Innumerable papers have been published in various journals by Dr. Barnes during the last twenty years. Personally, I believe the Check Lists of 1917 and 1926 have afforded the most lepidopterological popularity. Five volumes of "Contributions" were privately published and are a valuable asset to any library upon butterflies and moths, being well illustrated and containing many descriptions in addition to much revisional text matter. These volumes sell for about $45 when obtainable through book dealers.

"Probably the rarest butterfly which I was most thrilled by capturing", says Dr. Barnes, "was *Erebia magdalena* which is a beautiful black diurnal found only at very high elevations in

Colorado. It is taken in places where one doesn't have much room to move about in. *Brenthis alberta* and *Brenthis astarte* are also both very difficult to catch in perfect condition and are taken only at extreme altitudes in the Canadian Rockies. For many years I personally made collecting trips each summer. These were usually to the type localities of some species which it was desirable to get more material of, in order to be certain of identifications. Many of these trips were made with the veteran collector Bruce, also with Oslar and Elwes. Hall Valley and Glenwood Springs in Colorado were always two of the most prolific fields. Southern Utah used to be good until the sheep killed off most of the vegetation. Personally, I have never had any narrow escapes, but the Apache Indians got two of my collectors in an early day in Arizona. On one trip Bruce broke a leg when we were in a difficult high region and this caused some concern. On another occasion when we were collecting in a remote valley where lived only an old lady and her son, when we were packing up to leave their ranch the lady complained of a very severe abdominal pain. As Bruce and I had to be going, I left her a small bottle of laudanum with instructions to take a prescribed number of drops every 3 or 4 hours until relieved. Just before we got to the railroad which was out next destination many miles away, her boy came tearin down the road from the valley on a horse, bare back, saying his mother had taken the whole bottle and that he thought she was dead. I sent him back with word of what to do. It was impossible to do more under the circumstances. I never heard whether she died or not".

"Among the older collectors I personally knew W. H. Edwards, Henry Edwards, McGlashan, Graef, Hulst, Packard, Scudder, Strecker and most of the others in their time. Strecker was a very peculiar man when visiting you and it was better to stay close by his side as a protection to valuable specimens! He had a most peculiar habit of crawling in between the sheets with his boots and clothes on. When Bruce was around it was also very essential to keep your eyes open. He was always in the habit of stopping off in Decatur on his way home from his collecting trips so that I could have the privilege of going over his

catch and selecting what I cared for. On one of these occasions I was unavoidably called East, leaving him where he had access to the collection. At that time I had a number of new species on a spreading board. Among others *Rhododipsa masoni.* On my return I found these specimens had disappeared and very shortly afterwards I noticed Smith had described them, naming them after Mr. Mason of Denver. It seems that Mr. Mason was a very wealthy man, quite a little interested in Lepidoptera and Bruce was very anxious to get in his good graces, thinking that Mason would help finance his expeditions. *Masoni* is such a beautiful species that Bruce thought Mr. Mason would be pleased to have it named after him, so he sent the specimens to Prof. Smith, requesting him to name them after him"!

"I have made several trips through Italy, Germany, France, Austria and England studying types and various collections. On these trips I have always been very materially assisted in the work by Oberthür, Verity, Hampson, Prout, Merrick, Talbot, Riley, Bang-Haas, Durrant, LeCerf and many others. It is a real pleasure to know and correspond with most of these gentlemen".

In 1920 Dr. Barnes deeded the entire collection as a gift to the Decatur and Macon County Hospital, the collection to be sold and the money realized to be used by the Hospital Board to promote the cause of child welfare. Dr. Barnes practically founded this hospital and its directors are guided entirely in the matter of the collection's sale by him. The Doctor would like to see the collection go eventually to either Washington or Cambridge, but there should be an all-time curator placed in charge wherever it may go. There is enough unworked-up material available to keep one party busy for at least five years.

Dr. Barnes has not been so well this last spring and summer and he has practically given up all medical practice; however, each afternoon finds him busy among his butterflies and moths, keeping the records up to date or answering important correspondence. Such is the life of an entomologist and what more can any of us ask. At that, I think we get more satisfaction out of our existence than the average human being.

A Remarkable New Chilean Genus of Grasshopper (Orthoptera, Crytacanthacrinae).

By Morgan Hebard, Philadelphia, Pennsylvania.

(Plate XV.)

During a recent visit to the British Museum the author noted three specimens of a large and strikingly colored grasshopper, labelled simply "Chile", unlike any previously seen. The loan of these for study enables us to say that a new genus and species is represented, nearest *Litoscirtus insularis* Bruner, known only from Cerros Island, Lower California, but widely separated by many important characters.

These genera agree in general structure of head, short antennae, moderately hairy limbs, serrate dorsal carina of caudal femora and armament of caudal tibiae. Presence of apical spines on both dorsal margins of the caudal tibiae and fastigium declivent with lateral margins declivent cephalad are other important features in determining their position in the Cyrtacanthacrinae.

The new genus, *Aucacris,* combines with the above characters, the following. Frontal costa narrowed and moderately sulcate at juncture with fastigium. Pronotum with very low medio-longitudinal carina, which itself is finely longitudinally sulcate, interrupted by the transverse sulci and absent on the metazona; lateral carina indicated only by nodes; latero-caudal angles of lateral lobes distinctly flaring in dorsal aspect, rounded but distinctly angulate, rectangulate in male, obtuse-angulate in female. Tegmina reduced to very large pads. Caudal femora robust, genicular lobes rounded. Prosternal spine heavy, blunt conical, slightly transverse in male, more decidedly so in female.

Genotype,—Aucacris eumera new species.

The brilliant color of the caudal femora and tibiae and striking bands on the former constitute the most distinctive features of coloration.

Aucacris eumera new species. Plate XV, figure

This remarkable insect has the appearance of a large brachypterous Oedipodid, but examination shows that it belongs instead to the Cyrtacanthacrinae.

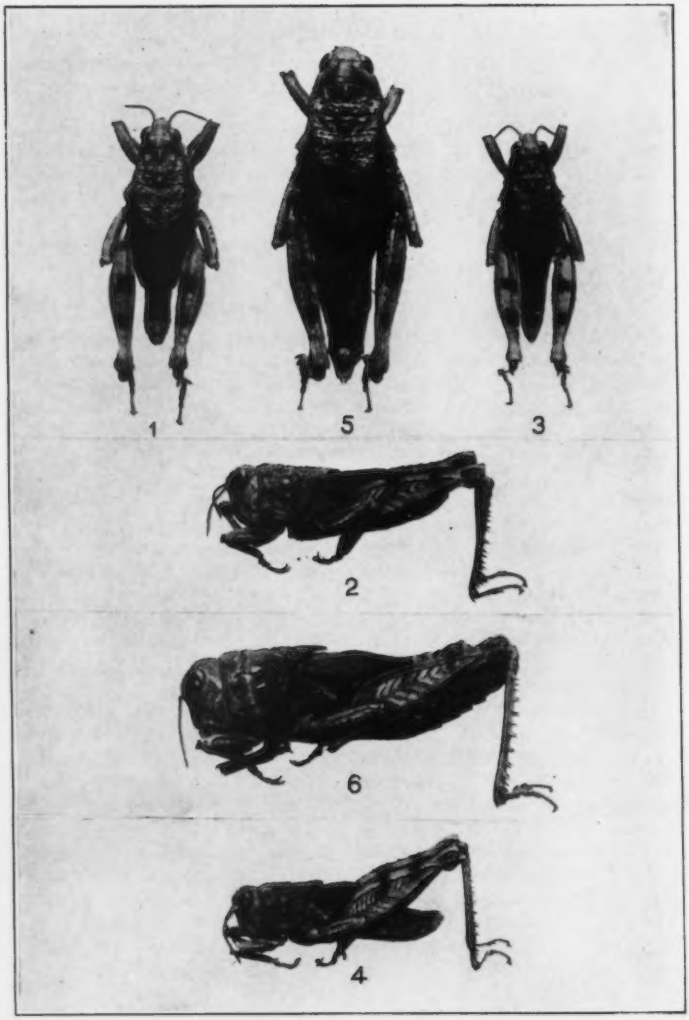
The closer relationship of *Litoscirtus insularis* Bruner is evident from a number of characters, though that genus super-

ficially suggests a greatly modified condition, with fully developed organs of flight, of the highly specialized type developed in the species of *Dracotettix* Bruner, the latter belongs to a very different phylum.

Type: ♂ ; Chile[1]. [British Museum.]

Size large, form robust. Antennae short and heavy, with (seventeen or eighteen) joints, of which all are very short except the ultimate, which is elongate conical. Fastigium declivent, rounding at slightly more than a right angle into the weakly oblique face; its lateral carinae distinct from just beyond the eyes, convergent and continued as those of the frontal costa; dorsal surface shallowly concave and smooth, back of which the occiput is feebly roughened and shows a very feeble, fine, medio-longitudinal carina. Eyes of moderate size and prominence. Lateral ocelli very small, smaller than in *Litoscirtus insularis*. Frontal costa sulcate throughout, narrow at juncture with fastigium, then expanded slightly with the lateral carinae percurrent to clypeus, faintly convergent just below median ocellus, elsewhere nearly parallel. A decided but slightly irregular vertical carina extending from between eye and antennal socket to clypeus, flanked by depressions, those toward the cheeks becoming sulcate ventrad. Pronotum rugose with decided transverse sulci dorsad; prozona with lateral and mesozona with lateral and meso-lateral larger nodes, metazona more coarsely, thickly and generally nodulose and bluntly sub-rectangulate produced caudad with lateral margins undulate. Tegmina represented by very large, overlapping pads which leave more than half the abdomen (when in normal position) exposed, their apices broadly rounded, their surfaces very thickly and regularly supplied with longitudinal veins and a multitude of cross-veinlets, dorsal very faintly defined from lateral fields. Wings vestigial, atrophied, lying wholly beneath the tegminal pads. Supra-anal plate as broad as long, lateral margins convex then concave convergent to the acute apex; dorsal surface raised meso-proximad and including a short medio-longitudinal sulcus, the raised area extending latero-caudad as two narrow rays which gradually narrow and disappear. Styles very short and slender. Subgenital plate small, convex-conical. Caudal femora with dorsal carina of external pagina finely serrate, not as thickly or as heavily as the dorsal carina. Caudal tibiae with ten external and nine slightly longer internal spines, regularly spaced except that the three disto-internal are closer than any of the others.

[1] This and the allotype undoubtedly came from the same locality. Both bear the number 81 over 56 on a circular label. The paratypic male is smaller, darker and more brilliantly colored and was probably secured at a different place.



AUCACRIS EUMERA—HEBARD.

Allotype: ♀ ; Chile. [British Museum.]

Generally similar to male, differing as follows. Size much larger. Fastigium and frontal costa broader and shallower, the latter showing stronger narrowing at dorsal extremity and just below median ocellus. Pronotum with prozona and mesozona with median carina and nodes less heavy, metazona less thickly and evenly nodulose but with a few larger scattered nodes which are longer than wide, much like those found in certain species of *Leprus*. Tegmina separated by a brief interval and showing scarcely a trace of differentiation between the dorsal and lateral fields. Ovipositor valves small, hairy, disto-external margins of dorsal valves very bluntly toothed, of ventral valves forming a short proximal lobe, all apices weakly curved and not elongate.

Body and tegmina mummy brown, head, antennae and pronotum heavily but not evenly overlaid with cinnamon in type and with clay color in allotype. Cephalic and medium limbs clay color. Caudal femora with external surfaces individually bright cinnamon buff, cinnamon and dull clay color, with three bands of black dorsad, first absent latero-externally, second and third weak on external pagina and there obsolete in the female, but continued across the ventral surface heavily in all, the first and second there connected broadly and the second and third narrowly by the same color along the ventral carina; these bands also crossing the internal face but there interrupted by the ventro-internal carina; internal surface and internal half of ventral surface brazil red (very rich) in males, peach red (pinkish) in female. Caudal tibiae and tarsi light scarlet red in males, the former paling to light orange yellow proximo-externally in the paratype, much duller, carnelian red in female with external surface and tarsi dull apricot buff.

The measurements of a male paratype from Chile, taken by H. L. Elwes and belonging to the author, follow those of the type. Length of body ♂ 24.8 and 23.2, ♀ 36.8; length of pronotum ♂ 9.1 and 7.2, ♀ 12; greatest dorsal width of pronotum ♂ 5.8 and 4.3, ♀ 7.8; exposed length of tegmen ♂ 9.7 and 7.2, ♀ 11.7; greatest width of tegmen ♂ 4.7 and 3.9, ♀ 6; length of caudal femur ♂ 15.8 and 14.2, ♀ 19; greatest width of caudal femur ♂ 5.6 and 4.7, ♀ 5.9 mm.

EXPLANATION OF PLATE XV.

(Figures 1⅓ natural size.)

Aucacris eumera new species. Fig. 1 and 2.—Type. Male.
Fig. 3 and 4,—Paratype. Male.
Fig. 5 and 6,—Allotype. Female.

Orphan Nests of Polistes (Hym.: Vespidae).

By PHIL RAU, Kirkwood, Missouri.

(Continued from page 232).

On August 7, about six more adults had emerged. I could not be sure of the exact number, since there was evidence that one or more of the open cells had been broken into violently; fragments of the paper and debris and even parts of *P. variatus* pupae were scattered on the floor of the box. The next day, one adult was caught red-handed at its cannibalism; it was calmly eating a pupa which it had just pulled out of its cell. Verily, of wasps too it may be said, "There's no accounting for tastes." These young cannibals heartily relished molasses, but flatly refused the larvae of *P. pallipes* when offered them on the forceps. This was indeed strange, since at this very time they were robbing the cells of their own young. Their refusal was not due to shyness, for they very readily accepted molasses offered on the forceps in the same way, often stretching out so far to reach it that they lost their balance. While some ate the molasses at once, others removed it from the forceps in as large a mass as they could handle and kneaded it in the forelegs and jaws, just as they do with a ball of caterpillar flesh. Later, these would go from cell to cell, feeding the young in the usual way. During this time the solitary male spent most of his time hiding in a nook on the roof of the nest next to the wall. He was a heavy feeder, and seldom came out of his hiding-place for other purposes. On August 8 he disappeared; whether he was careless or met with disaster, or whether he went forth in quest of his career, I do not know.

Another orphan nest of *P. variatus* was observed for some time. The three oldest workers were marked, "left-dot", "center-dot" and "yellow-tail", the younger ones which emerged later were left unmarked. The reader will note, throughout the story, how these three oldest ones gained and held the leadership in the management of the nest's affairs, while the younger ones never came to the fore.

A green caterpillar, held in the forceps, was offered to the

group of wasps. Several of them snapped and bit at it, as though it were a common enemy. Even when it was placed under the very noses of several, it was always refused. It was then laid on the roof of the nest. After about ten minutes it was sniffed at by "yellow-tail", then it was taken up, manipulated for a moment and dropped to the floor; whether by accident or with purpose, I do not know, but at least no effort was made to regain it or even go after it, though it was only fifteen inches away. So after a time I replaced the caterpillar on the roof. "Yellow-tail" again took it in her jaws, stood head downward on the side of the nest with the caterpillar dangling in mid-air while she malaxated it for a time, then kneaded it into a ball and fed it to the larvae, going from cell to cell, leaving a bit here and a bit there.

A little later, with a great deal of insistence, I got "yellow-tail" to accept a larva of *P. pallipes;* while she was malaxating it, "center-dot" took it away from her and completed the job. "Left-dot" now became interested also, and when the viscera was almost squeezed out and ready to be discarded, she took hold of the dangling refuse, with a quick jerk severed it from the good meat, and dropped it below. Then she succeeded in gaining possession of the food portion, and worked it over and over in her jaws. It should be reported that just before "left-dot" offered her assistance in this task, she was seen handling parts of a broken pupa which she had torn from its cell under her feet; whether she was actually robbing a cell for food, or merely finishing the task of clearing a cell of a dead pupa, I could not declare.

Another piece of food, this time a half-grown *pallipes* larva, was proffered to the group, and again "yellow-tail" took it, and artistically squeezed out the entrails. At the conclusion of the task, however, she had the wrong end of the mass in her mouth, so the food portion was in danger of being lost. She attempted to change its position, and to do so tried to drag it to the roof of the nest, but it was unwieldy, she lost her grasp and it fell.

Another *pallipes* larva, a mutilated one, was placed on the

roof of the nest. After a half hour it was discovered by a wasp which I thought, judging by its coloration and manner, was a male. Unlike the others, it stood on the roof beside the larva and with its jaws inserted, ingested lustily both juices and muscular tissue, without malaxating it or dividing it. Presently "left-dot" discovered the feast in progress and haughtily confiscated his victuals, literally taking the food out of his mouth, leaving him licking his chops and cleaning up any crumbs that adhered to the sides of his face. One such particle, a little speck no larger than a pin-head, he scraped from his cheek and seemed to cherish for a minute; then he carried it below and went seriously about peddling the lone crumb from cell to cell where the larvae were. I was eager to find out if the male plays any such part in the economy of the nest, so I watched all this closely, and at the end, took up the wasp to see if it really was a male. The sting clearly proved it to be a worker, but with the white face and coloration of a male. I do not know whether to say that this new worker was handicapped by male coloration and a male mind, or merely that she was young and had never learned the fine art of nursing.

The queen of another colony was lost in some homing experiments in June, so her small nest was taken into the laboratory. It contained, on July 1, five sealed cells, and another was sealed on July 4. Attention could be given to this only intermittently, but in a comparative way the notes are of value.

In just three weeks, on July 21, there were four adults on the nest; all of the activities of a well-appointed and queenly nest were in evidence. Pulp was being brought in, new cells begun, and some of the unfinished old ones were being completed, eggs were being deposited, and the attachment of the petiole to the wall strengthened. The instincts displayed here are indeed interesting. Imagine these young workers, coming out of their cells into their first light of day, and promptly taking up the task of completing the old unfinished cells where their unseen mother had left them! In reinforcing the support of the nest, there followed a new method. In nest 108, described above, the workers added more pulp all around

the pin and at its base, and even built props or guy-ropes from it to the wall. In this case the pin was entirely disregarded and a new petiole was made, connecting the nest with the wall, but this was rather a matter of form, because it was so weak that without the aid of the pin, it could not possibly have held the weight of the nest. Here we had proof also that their engineering estimates are not always correct because these workers thoroughly covered and reinforced with paper the head and upper part of the pin, above the point where it entered the nest and hence where the work was utterly useless.

Eggs were being deposited by the unfertilized workers in the shallow new cells, so it was easy to observe oviposition. One egg is deposited in each cell, but I had occasion to see a wasp lay a second egg in one cell. She placed the tip of the abdomen in the shallow cell and quietly held the position for a minute or two until the egg appeared and it immediately stuck to the wall. I say it stuck to the wall, because no effort was made to stick it there; it left the body already moist with glue, and it adhered to the wall where it touched. After the performance the wasp walked away, but returned after a few minutes, discovered the two eggs in the cell, pulled the last-laid one out, chewed it up carefully and swallowed it, discarding the shell. Instinctively, they lay eggs, and instinctively, it seems, they know that only one young wasp can live in each cell. Whether the wasp's consciousness or recognition of numbers is something more than instinct, or whether the fact that this one passed over the first egg and reached to get the new egg beyond it indicates something more plastic than instinct, I dare not say. Then, again, the fact that she recognized an abnormal condition and thereupon performed an abnormal act in eating her own egg—stretching a point to gain a meal—leads one to see how very plastic is their behavior.

In one orphan nest of *P. variatus,* where I had neglected to feed the larvae for a few days, one half-grown larva spun a cap to its cell. This was not flush with the top or protruding as usual, but down about one-third of the length of the cell below the edge.

Hibernation of the Striped Cucumber Beetle (Coleop.: Chrysomelidae).

W. V. Balduf, University of Illinois.

Where and how the striped cucumber beetle, *Diabrotica vittata* Fabr., spends the winter has long been a puzzling question. Most workers are satisfied that the adult stage carries the species through the cold season, but much mystery surrounds its exact location through that period. It may therefore be of interest to report that the writer discovered 59 living adults of this species in what seems to be its natural habitat for hibernation. Two miles south of Muncie, Illinois (near Urbana), is a small river valley bordered on the north by low, lightly forested hills ranging east to west. On January 20, 1929, 31 of the beetles were found on the south slope of such a hill, quite near its base, and about two rods from the south margin of the woods, which is bordered there by a public road. All these individuals occurred under two inches of foliage of trees within an area of two square feet around the base of an ash seedling about three feet high. Two of them were in actual bodily contact, but the rest were isolated by short distances and there was a slightly greater concentration nearest the ash.

Upon further investigation on January 28, 28 additional specimens were found under similar circumstances about five feet removed from the first lot. Again there was a heavy cover of dead foliage over the beetles, and in addition a few small decaying branches thrown together in a heap, and a few ash seedlings grew in their midst. A rather thorough examination of the acre surrounding these spots failed to reveal more of this species. No dead individuals were found in these places.

It is commonly stated in the literature dealing with *D. vittata* that it spends the winter in the soil, which is an absurd claim in view of the absence of fossorial devices on this insect. Most of the beetles taken on the above dates were on the soil surface with the leaves fairly compacted over them. A few of those found on the last date occurred in small shallow depressions about an inch deep and perhaps made by the feet of a small domestic animal or by the process of freezing and thawing. These pockets were full of leaf mold, and the presence of some

*Contribution No. 135 from the Entomological Laboratories of the University of Illinois.

beetles in them indicates the tendency of the insect to react to lowering temperatures by descending as far as their locomotor facilities make possible. Temperature readings on January 28 showed that the beetles were under conditions of 31 degrees Fahr. shortly before noon, with the sun shining, whereas the air temperature four feet above that spot and in the shade varied from 25 to 28 degrees Fahr., and in the sun and wind it was 36 to 37 degrees Fahr. The soil here was loose, and devoid of solid ice despite one of the most consistently cold winters known here within the last decade. A few ice crystals, probably formed from the melting of a light snow that fell a few days earlier, had formed among the laminae of leaves over the beetles. Upon direct exposure to the sun's rays, the beetles soon moved their appendages slightly.

It seems then that the striped cucumber beetle is gregarious in hibernation, resembling in this habit the common spotted ladybeetle *Ceratomegilla fuscilabris,* which, by the way, was abundant in this environment in its characteristic masses, but obviously sheltered by a comparatively thin blanket of leaves Another difference noted is that the lady beetle is most often found huddled at the base of a tree, whereas the cucumber beetle, while hidden on the woods floor, was removed about ten feet from the nearest tree. The two species did not occur directly together in the same spots.

Where did these cucumber beetles originate, and how did they succeed in meeting in two such narrowly-separated, localized spots? Residents in the valley stated that the nearest cultivated cucurbits were a little patch, constituting a small fraction of an acre, of watermelons one-fourth mile to the southwest of this spot. Others were more than a mile away. Old melons were still present on the ground in January, it was found. An open pasture field and two small fields of corn separated the cucurbit field and the hibernation quarters. It is presumed that the beetles made their way to the woods in the path of the wind individually, not collectively, by either a single, or a series of short flights. By what sense do they find one or two spots, the like of which, estimated by human judgment, were common all over the hillside? Does the forest margin serve as a wall that limits the extent of the flight? And is the direction of the

migration determined by either a positive or a negative reaction to the prevailing wind? It would seem that certain larger and broader features of the landscape, such as trees and hills, aided by the wind, serve to concentrate the beetles in a general way. After settling down within a relatively small area of a few square rods, perhaps gathering one now and another then, they come close enough together to enable individuals to detect one another by the sense of smell and what is probably to be designated as a specific body odor. Obviously such a fall migration flight must be made before low temperatures benumb the muscles. It is well known that these beetles concentrate on old cucurbit fruits in autumn, and feed there as long as edible substance remains, which has been found to exist as late as early November at Columbus, Ohio, or weeks after frosts have killed the foliage of the vines. Migration probably does not begin until the cucurbit food is no longer edible. By that time the forest foliage has mostly or entirely fallen, and the beetles coming to the forest margin, which ecologists claim to be the natural environment in which this species originally fed upon wild cucumber species, find the bed of leaves already formed. It is, then, probable that two or more tropisms,—(1) a positive or negative anemotropism, (2) attraction of individuals into a localized spot by sensing the body odor of the species, and (3) possibly an isolated small plant or other object may serve as a place for landing or congregation, from which they may then descend below the leaves when their geotropism is made positive by lowering temperature,—govern this insect in its migration from its adopted feeding ground on cultivated cucurbits to its primitive hibernation site.

If this gregarious habit is typical for the species, it can be readily understood why this common pest of the cucurbitaceous vine has so long eluded those interested in finding its true habit and habitat during the winter season. When the members of a generation from a given patch seem to center in a few square feet of area amid acres of what to man seems to contain hundreds of equally suitable sites for hibernation purposes, it is plain why this insect has not been discovered before in any numbers and in a situation that meets the requirements of the original habitat.

The Fourth Paper on New Species of Plagiognathus (Hemiptera: Miridae).

By HARRY H. KNIGHT, Iowa State College, Ames.

Plagiognathus negundinis n. sp.

Runs to *annulatus* Uhler in my key (Hem. Conn., 1923, p. 431), but differs in the longer second antennal segment which in the male is equal to or slightly exceeds width of pronotum at base; head more vertical and tylus less prominent.

♂. Length 4 mm., width 1.36 mm. Head: width .72 mm., vertex .37 mm. Rostrum, length 1.4 mm., reaching to middle of hind coxae. Antennae: segment I, length .27 mm.; II, 1.2 mm.; III, .75 mm.; IV, .35 mm.; black, tip of first segment pale, last two segments dusky brown. Pronotum: length .62 mm., width at base 1.17 mm.

Black, vertex pale, legs orange yellow, hind femora with a row of four or five black spots on antero-dorsal line, also one spot on median line of anterior face at middle of apical half, sometimes with two or three smaller dots, and two subapical black spots beneath, but rarely forming a black line above or beneath; tibiae yellow, knees, spines and spots at base of spines black; tarsi fuscous, apical segment black. Rostrum yellow, apex and basal half of first segment blackish. Membrane and veins fuscous, a clear spot behind smaller areole by apex of cuneus. Dorsum clothed with simple, recumbent, yellowish to dusky brown pubescence.

♀. Length 3.8 mm., width 1.4 mm. Head: width .71 mm., vertex .40 mm. Antennae: segment I, length .26 mm.; II, 1.02 mm.; III, .66 mm.; IV, .36 mm. Pronotum: length .64 mm., width at base 1.21 mm. Very similar to the male in pubescence and coloration.

Holotype: ♂ June 19, 1927, Ames, IOWA (H. H. Knight); Iowa State College collection. *Allotype*: taken with the type. *Paratypes*: 86 ♂ ♀ taken with the types on box elder (*Acer Negundo* L.). 40 ♂ ♀ June 14, 46 ♂ ♀ June 20, 1927, Ames, Iowa (H. H. Knight), taken on box elder where the species was breeding. ♂ ♀ June 2, ♂ 2 ♀ June 9, 1925, Ames, Iowa (H. H. Knight). ♂ 3 ♀ June 16, 5 ♂ June 25, 1927, Ames, Iowa (H. G. Johnston), taken on box elder. 6 ♂ ♀ June 3, 1912, Ames, Iowa (R. L. Webster), "associated with *Chaitophorus negundinis* Thos."

PLAGIOGNATHUS NEGUNDINIS **fulvotinctus** n. var.

Similar in structure to *negundinis* but runs in my key (Hem. Conn., 1923, p. 431) to *fraternus* Uhler from which it may be separated by having the femora orange yellow, not clouded with fuscous although with distinct black spots. Differs from typical *negundinis* in that the embolium, basal half of corium more or less, outer margin of clavus on basal half, and basal half of cuneus is pale to orange yellow.

Type: ♀ July 10, 1924, Fort Snelling, MINNESOTA (H. H. Knight), author's collection. *Paratypes*: 2♂ 4♀ June 14, 16♂ ♀ June 19, 9♂ ♀ June 20, 1927, Ames, IOWA (H. H. Knight), taken on box elder.

Plagiognathus crataegi n. sp.

Runs to *repetitus* Kngt. in my key (Hem. Conn., 1923, p. 431), while the paler females may run to *punctatipes* Kngt. Differs from *repetitus* in the larger size, relatively longer antennae, larger spots on hind femora, and front coxae uniformly yellow without fuscous at base. Separated from *punctatipes* by the uniformly yellow front coxae and the more broadly blackish antennae; males differ in form of left genital clasper.

♂. Length 3.4 mm., width 1.3 mm. Head: width .65 mm., vertex .31 mm.; black, vertex yellowish. Rostrum, length 1.21 mm., reaching to apices of hind femora, yellowish, basal segment and apex black. Antennae: segment I, length .21 mm.; II, .86 mm.; III, .56 mm.; IV, .32 mm.; black, last two segments more fuscous. Pronotum: length .50 mm.; width at base 1.02 mm.

Clothed with simple, recumbent, yellowish pubescence. Black, vertex yellowish; membrane uniformly dark fuscous, veins slightly paler. Legs yellow, tibial spots and spines black; hind femora with two rows of black spots on anterior face, clouded with fuscous; middle femora with a few small fuscous spots; coxae uniformly yellow, hind pair only with fuscous at base.

♀. Length 3.5 mm., width 1.4 mm. Head: width .68., mm., vertex .355 mm. Antennae: segment I, length .21 mm., black; II, .87 mm., dusky yellow to fuscous, basal one-fourth to one-third black, apex usually infuscated; III, .57 mm., dusky yellow; IV, .37 mm., dusky yellow. Pronotum: length .56 mm., width at base 1.11 mm. Very similar to the male in coloration and pubescence.

Holotype: ♂ July 2, 1928, Ames, IOWA (H. H. Knight); Iowa State College collection. *Allotype*: taken with the type. *Paratypes*: 24♂ ♀, taken with the types on *Crataegus* sp. where

the species was breeding. 10 ♂ ♀ June 2, 1925, Ames, Iowa (H. H. Knight), found breeding on Crataegus; some specimens reared from nymphs confined on tender foliage.

Crataegi is allied to *dispar* Kngt., a species found breeding on hickory in New York, but with cuneus pale at base while the second antennal segment is yellow and narrowly black at base.

Plagiognathus geminatus n. sp.

Allied to *ilicis* Kngt., but differs in the longer second antennal segment which exceeds length of rostrum; femora and scutellum infuscated, hemelytra uniformly pale greenish yellow, ♀. Length 3.5 mm., width 1.7 mm. Head: width .80 mm., vertex .37 mm. Rostrum, length 1.02 mm., reaching to middle of intermediate coxae, not equal to length of second antennal segment. Antennae: segment I, length .21 mm.; II, 1.21 mm.; III, .59 mm.; IV, .31 mm.; yellowish, becoming dusky on last two segments. Pronotum: length .71 mm., width at base 1.4 mm.

Pale greenish yellow, embolium and cuneus more greenish, disk of scutellum fuscous, membrane rather uniformly dusky; femora infuscated, hind femora darker, a row of small darker spots along median line of anterior aspect; tibiae pale, spines brownish and without spots at base. Clothed with simple, yellowish pubescence, more prominent on head and pronotum.

Holotype: ♀ April 7, 1928, College Station, TEXAS (H. G. Johnston); author's collection. *Paratypes*: 48 ♀ April 7, 20 ♀ April 11, 1928, taken with the type on *Ilex decidua* and *Ilex vomitaria* by Mr. Johnston. It seems rather remarkable that not a single male can be found in the large series studied. This species is another good example of Jordan's Law of geminate species, in that *geminatus* is the southwestern twin of *ilicis* Kngt. which was described from New York. These two species are indeed very similar except in structure of antennae and rostrum, and in the fuscous coloration. In the large series studied there is no variation in color.

Plagiognathus gleditsiae n. sp.

Allied to *delicatus* Uhler but distinguished by the broader head and shorter rostrum; scutellum black with median line pale, frons with a quadrate black spot each side of median line. ♀. Length 3 mm., width 1.29 mm. Head: width .72 mm., vertex .37 mm. Rostrum, length .77 mm., only attaining hind margin of mesosternum. Antennae: segment I, length .18 mm.,

black; II, .69 mm., brownish black, darker on base and apex; III, .38 mm., blackish; IV, .21 mm., black. Pronotum: length .55 mm., width at base 1.12 mm.

Coloration yellowish with fuscous and black; quadrate spot each side of frons, tylus, apex of lora, calli, broad rays extending from calli to basal margin of pronotum, triangular area behind coxal cleft, mesoscutum except lateral edge, scutellum except narrow median line, inner half of clavus except base, corium except base, sternum, apex of rostrum, and venter, fuscous to black. Cuneus somewhat dusky on middle. Membrane fuscous brown, darker within areoles, veins dusky, opaque yellow at apex of areoles. Legs yellowish, with three rows of black spots on anterior aspect, also spots above and on apical half of posterior aspect. Tibiae with black spots at base of spines, but becoming obsolete apically; tarsi fuscous, apices black. Clothed with short, recumbent, simple fuscous to black pubescence, yellowish on ventral surface.

Holotype: ♀ April 13, 1928, College Station, TEXAS (H. G. Johnston); author's collection. *Paratypes*: 9 ♀, taken with the type on honey locust (*Gleditsia triacanthos*).

Plagiognathus subovatus n. sp.

Runs to *albocuneatus* Kngt. in my key (Hem. Conn., 1923, p. 431) but distinguished by the shorter antennae, both sexes with segment III shorter than width of head across eyes; male differs in the shorter and more rounded posterior lobe of left genital clasper, while second antennal segment is not equal to basal width of pronotum; female differs in the strongly arcuate embolar margins, veins of membrane pale, size distinctly smaller and more ovate.

♂. Length 3.6 mm., width 1.45 mm. Head: width .77 mm., vertex .38 mm. Rostrum, length 1.39 mm., reaching to middle of hind coxae, largely fuscous. Antennae: segment I, .27 mm., black; II, 1.06 mm., black; III, .64 mm., dusky yellow; IV, .44 mm., pale fuscous. Pronotum: length .59 mm., width at base 1.12 mm. Hemelytra with embolar margins moderately arcuate. Clothed with prominent, simple, pale to yellowish recumbent pubescence.

Black, vertex, spot just behind calli on middle of disk, lower margins of propleura, median line of scutellum but frequently obsolete on middle, outer half of clavus, basal half of corium, embolium, cuneus, and legs largely, pale. Membrane fuscous, slightly paler on middle, veins and spot behind smaller areole, pale. Coxae with basal third fuscous; apical half of femora with two rows of spots on anterior aspect, also group of spots on posterior face black, becoming obscured with fuscous; front

and middle femora with a row of four or five small black dots on median line beginning at middle. Tibiae with spots and spines black, tarsi fuscous. Genital claspers distinctive, left clasper with posterior lobe shorter and more rounded than in *albocuneatus*.

♀. Length 3.4 mm., width 1.6 mm. Head: width .77 mm., vertex .40 mm. Antennae: segment I, length .27 mm.; II, .99 mm.; III, .67 mm.; IV, .42 mm. Pronotum: length .59 mm., width at base 1.17 mm. Embolar margins more strongly arcuate than in the male, pubescence and coloration very similar but somewhat more broadly pale.

Holotype: ♂ July 9, 1921, St. Anthony Park, St. Paul, MINNESOTA (H. H. Knight), taken at light; author's collection. *Allotype*: Aug. 11, taken at the same light. *Paratypes*: 3♀ July 6, ♀ July 8, ♀ July 10, ♂ July 9, 1921, topotypic, taken at light.

This species is allied to *albonotatus* Kngt. but differs in the black second antennal segment and in form of the genital claspers, general form also somewhat larger.

Plagiognathus fusciflavus n. sp.

Allied to *alboradialis* Kngt., but differs in that both sexes are rather similar and more broadly pale; scutellum pale with basal angles broadly fuscous; corium pale, a longitudinal fuscous stripe thru the middle; cuneus pale yellowish brown, darker on middle.

♂. Length 4.1 mm., width 1.45 mm. Head: width .75 mm., vertex .37 mm.; yellowish, lora and tylus black, the latter with a spot on each side of a Y-shaped mark at base, pale; gula, spot above base of antennae and obsolete marks on frons, fuscous. Rostrum, length 1.55 mm., reaching upon fourth ventral segment, yellowish, last two segments black. Antennae: segment I, length .26 mm., black; II, 1.15 mm., black; III, (broken). Pronotum: length .56 mm., width at base 1.12 mm.; pale to yellow, calli fuscous, black on inner margins, yellow before, narrow collar margin black; propleura fuscous, lower margin pale. Mesoscutum rather broadly exposed, yellowish; scutellum pale yellowish, basal angles rather broadly infuscated, sutural line at base blackish but obsolete on middle.

Dorsum and venter clothed with simple yellowish pubescence, but blackish on the legs. Hemelytra pale, corium with a longitudinal fuscous stripe thru the middle, only slightly wider apically; commissural edges of clavus blackish; cuneus yellowish brown, darker on middle. Membrane pale to dusky, a

fuscous spot each side just behind apex of smaller areole, anal area blackish; veins yellowish, an opaque callous mark bordering apex of larger areole. Ventral surface fuscous but not entirely obscuring the yellowish pigment of the hypodermis; ostiolar peritreme yellowish. Legs yellowish, femora with rows of black spots, larger on hind femora, but those on posterior aspect grouped on distal half. Tibiae with knees, spots and spines, black; tarsi black.

♀. Length 4 mm., width 1.5 mm. Head: width .77 mm., vertex .41 mm. Antennae: segment I, length .26 mm.; II, 1.03 mm.; III, .68 mm.; IV, .38 mm.; black. Pronotum: length .56 mm., width at base 1.15 mm. Very similar to the male in pubescence and coloration, but venter more broadly yellowish, posterior half of each segment only blackish.

Holotype: ♂ June 26, 1926, LaGrande, OREGON (E. W. Davis); author's collection. *Allotype*: same data as the type.

Plagiognathus fuscipes n. sp.

Runs to *laricicola* Kngt. in my key (Hem. Conn., 1923, p. 431) but distinguished by the longer rostrum and more prominent and pointed head.

♂. Length 3.7 mm., width 1.3 mm. Head: width .77 mm., vertex .37 mm., moderately produced, tylus prominent as viewed from above. Rostrum, length 1.96 mm., reaching upon fifth ventral segment, black. Antennae: segment I, length .27 mm.; II, 1.05 mm.; III, .66 mm.; IV, .42 mm.; black, last two segments pale fuscous. Pronotum: length .53 mm., width at base 1.09 mm.

Clothed with moderately prominent, pale to yellowish pubescence. Color black with a tinge of brown, the cuneus uniformly black like the corium. Membrane and veins uniformly dark fuscous, slightly paler by tip of cuneus. Vertex transversely pale. Legs uniformly fuscous over a lighter ground color, tibiae slightly paler, spines with small basal spots black; hind femora with a double row of black spots showing thru the fuscous shade; apical half of coxae and the trochanters pale.

♀. Length 3.6 mm., width 1.48 mm. Head: width .72 mm., vertex .39 mm. Antennae: segment I, length .24 mm.; II, .96 mm.; III, .65 mm.; IV, .35 mm. Very similar to the male in pubescence and coloration.

Holotype: ♂ August 9, 1925, Veta Pass, COLORADO (H. H. Knight); author's collection. *Allotype*: same data as the type. *Paratypes*: 7 ♂ 2 ♀ taken with the types on *Dasiophora fruticosa* L. where the species was evidently breeding.

An Unusual Catocala Colony (Lepid.: Noctuidae).

By Lucien Harris, Jr., Macmillan Company, Publishers, Atlanta, Georgia.

While it is not unusual to find many species of lepidoptera abounding in certain areas, it has been my good fortune to find here in Atlanta, in a very restricted area, twenty-seven species and ten variations of moths belonging to the genus *Catocala.*

Some are common and some are rare, but they were all taken in a little wooded ravine not over two acres in extent. The very limited space in which I have found all of these, and the further fact that none is to be found in other nearby patches of woods, makes this particular place quite unusual.

The woods in this little ravine are rather open and made up of the following trees: pine (quite a number), a few immense poplars, a good many oaks, and the following in decreasing numbers, beech, hickory, dogwood, sweet gum, ironwood, willow and hawthorne.

Several species of the *Catocalae* are very abundant during their particular season of the summer. Of these I would especially mention *C. epione, C. cara,* var. *carissima, C. ilia, C. maestosa, C. lacrymosa and C. innubens.* A few others are common in certain favorable years. I remember two years ago I took a number of *C. consors* in this place where previously it had been very rare. Also during one excellent year for *Catocalae* I counted forty-five *C. maestosa* sitting on one poplar tree. One day last year I found fifteen of the beautiful *C. cara* variety *carissima* all under a favorite log. In this colony, *C. cara* itself is seldom found. In fact I have seen and taken only four or five specimens, but the form *carissima* is abundant.

I would like to make special mention of a few of the moths encountered. My first *C. marmorata* was found sitting on a medium sized pine tree. At rest it resembled a very large *C. maestosa* and it was not until the cyanide jar was quickly thrust over it, that I realized what a prize had been captured. The following year I caught another one within a hundred feet of the same spot. It was sitting on one of the large poplars. Both were fresh specimens and were taken in August.

C. angusi form *lucetta* I find is partial to the pine as a place to rest. *C. lacrymosa* rather prefers the beech and dogwoods, while *C. vidua* and *maestosa* seem to like the poplars as a resting place, or perhaps I should say hiding place for their colors and markings blend remarkably well. *C. nebulosa* I found sitting with several *carissima* underneath a log that had fallen across a small stream that flows through these woods. *C. ilia* is usually plentiful and is to be found each year in several varietal forms.

C. mira appears to be out of its recorded range but the specimen taken is undoubtedly this species.

For those interested I am giving a complete list of the *Catocalae* taken up to date in this little area. The nomenclature is that given in Barnes and McDunnough's work on *Catocala.*

Agrippina (Strecker), *agrippina* form *subviridis* (Harvey), *alabamae* (Grote), *amatrix* (Hübner), *amatrix* form *selecta* (Walker), *amica* (Hübner), *amica* form *nerissa* (Hy. Edwards), *andromeda* (Guenée), *angusi* form *lucetta* (Hy. Edwards), *cara* (Guenée), *cara* form *carissima* (Hulst), *consors* (Abbott and Smith), *crataegi* (Saunders), *elonympha* (Hübner), *epione* (Drury), *flebilis* (Grote), *ilia* (Cramer), *ilia* form *conspicua* (Worthington), *ilia* form *duplicata* (Worthington), *innubens* (Guenée), *innubens* form *scintillans* (Grote), *insolabilis* (Guenée), *lacrymosa* (Guenée), *lacrymosa* form *evelina* (French), *lacrymosa* form *paulina* (Hy. Edwards), *maestosa* (Hulst), *marmorata* (Edwards), *mira* (Grote), *nebulosa* (Edwards), *obscura* (Strecker), *piatrix* (Grote), *robinsoni* (Grote), *ulalume* (Strecker), *ultronia* (Hübner), *ultronia* form *celia* (Hy. Edwards), *vidua* (Abbott and Smith), *Euparthenos nubilis* form *fasciata* (Beutenmüller).

Three New Species of Agrilus (Coleop.: Burprestidae).

By J. N. KNULL, Pennsylvania Bureau of Plant Industry.

Agrilus duncani n. sp.

Head bronzy green; pronotum dark blue almost black; elytra cupreous, suture dark blue; ventral surface dark blue, more shining than above.

Head convex, a slight median depression, rugosely punctate, densely clothed with recumbent pubescence; antennae short, serrate beginning with the fifth joints.

Pronotum slightly wider than long, convex, widest at middle, sides arcuately rounded to just behind the middle, then strongly

sinuate to posterior angles; marginal and submarginal carinae feebly sinuate, separated anteriorly and joined near base; anterior margin strongly sinuate, median lobe broadly rounded; disk convex, broad oblique depression along each lateral margin; prehumeral carinae distinct, surface finely transversely rugose, sparsely clothed with recumbent pubescence, which is more numerous laterally. Scutellum granulate, without transverse carina.

Elytra at base slightly wider than pronotum at base, sides sinuate, tips rounded, slightly prolonged, strongly serrulate; sides of abdomen visible from above; disk slightly flattened, sutural margins strongly elevated posteriorly, moderate basal depressions; surface densely imbricate-punctate, recumbent pubescence sparse, more prominent along suture.

Abdomen beneath finely punctate, pubescent, first and second segments united, suture between the two segments faintly indicated at sides, median depression smooth, extending to middle of second ventral segment; pygidium without projecting carina. Prosternum densely clothed with long white pubescence, prosternal lobe broadly rounded, feebly emarginate in front. Tarsal claws on anterior and middle feet toothed, inner portions only feebly turned inward, the tips distant, posterior tarsi lacking. Length 6 mm., width 1.5 mm.

Described from one male specimen in the collection of the writer, labeled Sierra Ancha Mountains, ARIZONA, D. K. Duncan collector. The species would run to *Agrilus ferris* Dury in Fisher's key,* but the antennae being serrate from the fourth joint will at once separate it from that species.

Agrilus fisheri n. sp.

Color, form and markings of *Agrilus felix* Horn, brownish cupreous, a vitta on each side of pronotum and elytra formed by white pubescence.

Head with slight median depression on vertex; surface granulate, lower half covered with dense white pubescence which conceals the surface; antennae serrate beginning with the fourth joints.

Pronotum nearly twice as wide as long, slightly wider at apex than at base, widest in middle; sides arcuate from apex to base; marginal and submarginal carinae sinuate, separated in front and joined near base; anterior margin broadly sinuate; disk slightly flattened, with two median depressions, anterior one broad, lateral oblique depressions deep; prehumeral carinae distinct, surface granulose, lightly transversely rugose. Scutellum granulate, transversely carinate.

* W. S. Fisher—U. S. National Museum, Bul. 145.

Elytra at base wider than base of pronotum; sides sinuate, tips rounded, serrulate; sides of abdomen exposed above; disk with a longitudinal costa on each side, sutural margins elevated on apical third, basal depressions deep; surface imbricate. Abdomen beneath finely punctate, a dense patch of white pubescence on each side of each abdominal segment; pygidium carinate, carina projecting.

Prosternum densely clothed with recumbent white pubescence, prosternal lobe broadly rounded, feebly emarginate, prosternal process with sides parallel between and behind front coxal cavities, tip acute. Tarsal claws similar on all feet, cleft, inner tooth slightly shorter but not turned inward.

Length 8 mm., width 2.5 mm.

Described from one female specimen in the collection of the writer labeled Phoenix, ARIZONA, June 2, 1927, A. A. Nichol collector.

According to Fisher's key, the species would run to *Agrilus macer* Lec., however the white vittae on the dorsal surface will at once separate it from that species. Named for Mr. W. S. Fisher, who kindly compared the three species described in this paper with the types in the National Museum collection.

Agrilus parafloridanus n. sp.

Color bronzy green, form of a stout *Agrilus floridanus* Cr.

Head with a broad depression on vertex; surface irregularly rugose; antennae short, serrate beginning with the fifth joints.

Pronotum wider than long, wider at apex than at base, widest in middle; sides arcuately rounded, from apical angles to base; marginal and submarginal carinae sinuate, widely separated anteriorly, connected near base; anterior margin strongly sinuate, median lobe broadly rounded; disk convex, with two slight median depressions, lateral depressions deep; prehumeral carinae not sharp, but well indicated; surface coarsely, transversely rugose, punctate between rugae. Scutellum transversely carinate.

Elytra at base as wide as base of pronotum; sides sinuate to broadly rounded tips, tips serrulate; sides of abdomen exposed from above; disk flattened, sutural margins elevated posteriorly, basal depressions deep; surface densely coarsely imbricate-punctate, sparsely clothed with small hairs, a small patch of indistinct pubescence on each elytron in front of middle and on apical fourth, which give the appearance of spots.

Abdomen beneath imbricate, clothed with recumbent hairs, first and second segments united, suture between the two segments faintly indicated at the sides; pygidium with a feeble longitudinal carina, which does not project.

Prosternum densely clothed with recumbent pubescence; anterior margin truncate; prosternal process wide, sides parallel to apex, which is truncate.

Tarsal claws similar on all feet, cleft, inner tooth shorter than outer, not turned inward.

Length 7.5 mm., width 2 mm.

Described from one female specimen in the collection of the writer, labeled Apopka, FLORIDA, July 11, 1926, E. D. Ball collector.

According to Fisher's key, this species would run to *Agrilus floridanus* Crotch, but it can be separated from that species by the color, the head being more deeply depressed; wider and more coarsely sculptured pronotum.

A Swarm of Dragonflies in Costa Rica (Odonata).

On the morning of January 3d of the current year, at about 8 A. M., I was standing on the front porch of my home when I saw what seemed to me a swarm of locusts flying at a great height from east to the west, more or less. It was impossible to tell what they were, but in the afternoon of the same day while I was in the back yard, I noticed another swarm flying low and I thinking they would land on the nearby fields came out and ran toward the direction in which I had seen them flying, but with little or, better, no success, except that I was able to see that the insects were large dragonflies and not locusts, as I imagined before. The following day I found that a man from Tres Rios had also noticed a swarm of dragonflies flying towards San José on the same day, and also few persons in Turrúcares and Rio Grande. They tell me also that some school children in Rio Grande have captured some and that they are about four inches from one end to the other of the wings. I shall try very hard to obtain a sample of them.

C. MADRIGAL MORA, Liceo, San José, Costa Rica.

In reference to this note by Mr. Mora, Prof. J. F. Tristán wrote: "I tried to get some specimens of this dragonfly, but it was impossible, because they fly very high and very quickly. My colleague, Mr. C. Madrigal Mora, Professor of English at the Liceo, saw this swarm and I asked him to write a description of this, new to me, phenomenon. I am sending you herewith the description. Many persons spoke to me about this swarm of *pipilachas*. A teacher told me that he had seen the same flock of *libélulas* in Turrúcares the same day. I can say that the flock was seen in Escasú, San José and Tres Rios."

—J. FID. TRISTÁN, San José, Costa Rica.

Entomological Literature

COMPILED, WITH THE ASSISTANCE OF "BIOLOGICAL ABSTRACTS," UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted: but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers **within brackets** [ ] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. The number of, or annual **volume,** and in some cases the part, heft, &c. the latter **within** ( ) follows; then the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☛*Note the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL. — Andrews, E. A. — Population of ant mounds. [73] 4: 248-257. **Cook, W. C.**—A bioclimatic zonation for studying the economic distribution of injurious insects. [84] 10: 282-293, ill. **Driggers, B. F.**—Some parasites of the oriental peach moth in New Jersey. [6] 37: 169-170. **Essig, E. O.**—Entomological sentiment. [7] 22: 335-340. **Herrick, G. W.**—The procession of foreign insect pests. [76] 1929: 269-274, ill. **Hudson, G. V.**—Some aspects of modern methods in entomology. [8] 65: 146-151. **Hyslop, J. A.**—Common names and taxonomy. [5] 36: 107-111. **Imms, A. D.**—Some methods of technique applicable to entomology. [22] 20: 165-171. **McAtee, W. L.** — Further notes on insect inhabitants of bird houses. [10] 31:105-111. **Parfentjev, I. A.**—The development of Russian entomology. [6] 37: 153-155. **Showalter, W. J.**—Exploring the wonders of the insect world. [Nat. Geog. Mag.] 56: 1-27, ill. **Smith, H. S.**—On some phases of preventive entomology. [76] 1929: 177-184. **Smith, H. S.**—Multiple parasitism: its relation to the biological control of insect pests. [22] 20: 141-149. **Soliman, B. L.**—The immunity and resistance of plants to insect attack. [Bull. Soc. Roy. Ent. Egypt] 1928: 81-95. **Vayssiere, P.** — La lutte contre les insectes nuisibles au cotonnier et à la canne à sucre aux Etats-Unis. [Rev. Bot. Appl. Agric. Trop. Paris] 5: 121-125, ill. **Weiss, H. B.**—The entomology of Aristotle. A note on veterinary entomology of the Sixteenth Century. [6] 37: 101-109, 159-161. **Wisherd & Murayama.**—Insect rivals of the rainbow. [Nat. Geog. Mag.] 56: 28-90, ill.

ANATOMY, PHYSIOLOGY, ETC.—Abbott, C. E.—The comparative morphology of the spiracles of two species of weevils. [7] 22: 331-334, ill. **Bridwell, J. C.**—Thelytoky or arrhenotoky in Sclerodermus immigrans. [5] 36: 119-120. **Brindley, M. D. H.**—On the repugnatorial glands of Corixa. [36] 77: 7-13, ill. **Casteel, D. B.**—Histology of the eyes of x-rayed Drosophila. [42] 53: 373-385, ill. **Cousin, G.**—Influence de l'etat hygrométrique du milieu sub l'évolution larvaire de Lucilia sericata. [77] 101: 913-915. **Dakessian, V. S.**—Variation and correlation on the legs of the honeybee. [7] 22: 168-174, ill. **Dolley & Farris.**—Unicellular glands in the larvae of Eristalis tenax. [6] 37: 127-134, ill. **Eltringham, H.**—On the scent organs of Opsiphanes cassiae lucullus (Brassolidae). [36] 77: 1-4, ill. **Frew, J. G. H.**—Studies in the metabolism of insect metamorphosis. [Brit. Jour. Exp. Biol.] 6: 205-218, ill. **Garbarskaja, M.**—Ueber das verhalten der malpighi'schen gefässe einiger Sphingidae-arten während der metamorphose, unter berücksichtigung der veränderungen des zellkernes. [89] 51: 63-110, ill. **Gatenby & Mukerji.**—The spermatogenesis of Lepisma domestica. [53] 73: 1-6, ill. **Grimshaw, P. H.**—Instinct and intelligence in insects. [Scottish Nat.] 1929: 97-101. **Grossman, E. F.**—Biology of the Mexican cotton boll weevil. III. The mechanism of grub feeding. [39] 13: 32-33. **Halik, L.**—Beitrag zur kenntnis der Sinnesborsten bei Hydracarinen. [34] 83: 164-168, ill. **Hanson & Winkleman.**—Visible mutations following radium irradiation in Drosophila melanogaster. [Jour. Heredity] 20: 277-286, ill. **Henson, H.**—On the development of the mid-gut in the larval stages of Vanessa urticae. [53] 73: 87-105, ill. **Hirschler, J.**—Sur un appareil de golgi primaire et secondaire dans les spermatides de Palomena viridissima (Rhynchote-Pentatomide). [77] 101: 850-852, ill. **Keeler, C. E.**—Critical data upon thelytoky in Scleroderma immigrans. [5] 36: 121-122. **Krumbiegel, I.**—Untersuchungen über die ein wirkung der fortpflanzung auf altern und lebensdauer der insekten, ausgeführt an Carabus und Drosophila. [89] 51: 111-162, ill. **Lee, M. O.**—Respiration in the insects. [73] 4: 213-232. **Marcu, O.**—Nervenendigungen an den muskelfasern von insekten. [Anatomischer Anzeiger] 67: 369-380, ill. **Nel, R. I.**—Studies on the development of the genitalia and the genital ducts in insects. Female of Orthoptera and Dermaptera. [53] 73: 25-86, ill. **Paterson, J. T.**—The production of mutations in somatic cells of Drosophila melanogaster by means of x-rays. [42] 53: 327-372, ill. **Paterson, J. T.**—X-rays and somatic mutations. [Jour. Heredity] 20: 261-267, ill. **Samtleben, B.**—Anatomie und histologie der abdominalund thoraxmuskul-

atur von stechmückenlarven. [94] 134: 180-269, ill. **Schrader, W.**—The causes of change in color patterns of butterfly aberrations. [38] 28: 8-11, ill. **Schultz, J.**—The minute reaction in the development of Drosophila melanogaster. [Genetics] 14: 366-419, ill. **Scott, H.**—Blind instinct or conscious action? [8] 65: 161-162. **Steiner, L. F.**—Homologies of tracheal branches in the nymph of Anax junius based on their correlation with the muscles they supply. [7] 22: 297-308, ill. **Tunkl, F.**—Gedanken über die puppenruhe. [26] 9: 266-269. **Vignon & Séguy.**—Sur la présence de la nervure médiane haute chez les Diptères. [69] 188: 1699-1701, ill. **Voukassovitch, P.**—Contribution a l'etude de Macrocentrus abdominalis et de ses parasites. (Braconidae). [24] 98: 163-187, ill. **Weyrauch, W. K.**—Die hypnose bei Forficula auricularia. 4. Beitrag zur mneme. [46] 15: 109-155. **Whiting, P. W.**—X-rays and parasitic wasps. [Jour. Heredity 20: 269-276, ill.

ARACHNIDA AND MYRIOPODA.—Baerg, W. J.—Cocoon-making by the tarantula. [7] 22: 161-164, ill. **Chamberlin, J. C.**—On some false scorpions of the suborder Heterosphyronida (Arachnida-Chelonethida). [4] 61: 152-155. **Gerhardt, U.**—Zur vergleichenden sexualbiologie primitiver spinnen, insebesondere der Tetrapneumonen. [46] 14: 699-764, ill. **Oudemans, A. C.**—Kritisch historisch overzicht der Acarologie. Tweede Gedeelte. [101] 72, Suppl: 1097 pp, ill. **Oudemans, A. C.**—C. D. Sherborn en de Acarologie. [58] 7: 473-476. **Schiffer, P.**—Mites on Sceloporus. [Copeia] 171: 45-46.

THE SMALLER ORDERS OF INSECTS.—Beamer, R. H.—Studies on the biology of Kansas Cicadidae. [Kansas Univ. Sci. Bull.] 18: 155-263, ill. **Davies, W. M.**—Dragonflies in folk-lore. [31] 124: 55. ***Frison, T. H.**—Fall and winter stoneflies, or Plecoptera, of Illinois. [Illinois Nat. Hist. Surv. Bull.] 18: 345-409, ill. **Longfield, C.**—A list of Odonata of the state of Matto Grosso, Brazil. [36] 77: 125-139, ill. **Wheeler, W. M.**—A Camponotus mermithergate from Argentina. [5] 36: 102-106, ill. **Williams, C. B.**—Some records of dragonfly migration. [9] 62: 145-148.

ORTHOPTERA.—Berland, L.—Remarques sur le soln que certaines Blattes prennent de leur oothèque. [25] 1929: 172-174. ***Hebard, M.**—The orthoptera of Colorado. [Proc. Ac. Nat. Sc. Phila.] 81: 303-425, ill. ***Little, V. A.**—A new grasshopper (Acrididae) from Texas. [10] 31: 114-116, ill.

HEMIPTERA.—Bare, C. O.—Haemoglobin cells and other studies of the genus Buenoa (Notonectidae). [Kansas Univ. Sci. Bull.] 18: 265-349, ill. **Beamer, R. H.**—

Scolops osborni in Kansas. (Fulgoridae). [103] 2: 70. **Breakey, E. P.**—The genus Scolops (Fulgoridae). [Kansas Univ. Sci. Bull.] 18: 417-455, ill. **Carpenter, I. P.**—Study of the life history and spotting habits of Eutettix chenopodii (Cicadellidae). [Kansas Univ. Sci. Bull.] 18: 457-483, ill. ***Goding, F. W.**—New Membracidae, VIII. [6] 37: 167-168. ***Goding, F. W.**—New Membracidae, IX. [6] 37: 171-174. ***Hungerford, H. B.**—Some new semi-aquatic hemiptera from South America with a record of stridulatory devices. (Velliidae-Velia.) [103] 2: 50-57. ***Knight, H. H.**—Rectifications for Blatchley's "Heteroptera" with the description of a new species. [19] 24: 143-154. **Knight & McAtee.**—Bugs of the family Miridae of the District of Columbia and vicinity. [50] 75, Art. 13: 27pp. **MacGill, E. I.**—The biology of Thysanoptera with reference to the cotton plant. IV. The relation between the degree of infestation and surface caking of the soil. [35] 16: 288-293, ill. ***Martin, C. H.**—An exploratory survey of characters of specific value in the genus Gelastocoris and some new species. (S). [Kansas Univ. Sci. Bull.] 18: 351-369, ill. **Maxson & Knowlton.**—The tribe Pemphigini (Aphididae) in Utah. [7] 22: 251-271, ill. **Shull, A. F.**—Determination of types of individuals in aphids, rotifers and cladocera. [Biol. Reviews & Biol. Proc. Cambridge Phil. Soc.] 4: 218-248. **Steinweden, J. B.**—Bases for the generic classification of the coccoid family Coccidae. [7] 22: 197-243, ill. ***Walley, G. S.**—Notes on the genus Philaenus in America north of Mexico, (Cercopidae). [4] 61: 155-157.

LEPIDOPTERA.—***Clark, B. P.**—Sundry notes on Sphingidae, descriptions of sixteen new forms, and of one new genus. [Pro. New England Zoo. Club] 11: 7-24. ***Dyar & Heinrich.**—A new myelois from Brazil (Pyralidae: Ohycitinae). [10] 31: 116-118, ill. ***Forbes, W. T. M.**—The genus Ecpantheria (Arctiidae). [7] 22: 310-330. **Gilliatt, F. C.**—The bionomics of the tortricid moth, Eulia mariana. [Trans. R. Soc. Canada, Biol. Sc.] 23 Sec. 5: 69-84, ill. **Haldy, B.**—Schmetterlingsschutz. [Natur. Monatsschrift Heimat] 42: 238-243, ill. **Hayward, K. J.**—Larval descriptions from Argentine. [19] 24: 91-93, cont. **Holland, W. J.**—The first picture of an American butterfly. [76] 1929: 45-48. **Johnson, C. W.**—A flight of Pieris monuste. [5] 36: 92. **Klots, A. B.**—The genus Anteos (Pieridae). [19] 24: 134-142, ill. **Krüger, E.**—Einige beobachtungen über Morpho hecuba (fluggewohnheiten, eiablage, junge raupe, nährpflange), perseus, achilleus (eir), rhodopteron (ei, nährflange, kopula), rhetenor (kopula). (S). [17] 46: 22-23. **Peking u. Roth.**—Mitteilungen des verbandes

deutschsprachlicher entomologen-vereine. [Schmetterlingspräparation]. [26] 9: 225-230, ill. ***Riley, N. D.**—Three new species of Hesperiidae from Matto Grosso. [Bull. Hill Mus.] 3: 134-138, ill. **Salt, G.**—Castniomera humboldti, a pest of bananas. (S). [22] 20: 187-193, ill. **Sherborn, C. D.**—On some essays and proofs by Jacob Hübner. [75] 4: 80-82. **Stichel, H.**—Die veröffenlichungen über Eryciniden von A. Seitz im spiegelbild der kritik. [63] 43: 85-96. ***Talbot, G.**—A new genus of Pericopinae (Arctiidae). (S). [Bull. Hill Mus.] 3: 133. ***Talbot, G.**—New forms of butterflies from South America. [Bull. Hill Mus.] 3: 143-147. **Tams, W. H. T.**—Notes on the study of the wing-patterns of moths. [Nat. Hist. Mag.] 2: 58-63, ill. **Zikán, J. F.**—Myrmekophilie bei Hesperiden? [17] 46: 27-28.

DIPTERA.—*Aldrich, J. M.—Three new acalyptrate diptera. [10] 31: 89-91. ***Aldrich, J. M.**—A revision of the two-winged flies of the genus Procecidochares in North America with an allied new genus. [50] 75, Art. 2: 13pp. ***Alexander, C. P.**—Undescribed species of the genus Limnophila from eastern North America. [19] 24: 187-191. ***Alexander, C. P.**—Records and descriptions of neotropical crane-flies (Tipulidae), VI. [6] 37: 89-99. ***Bromley, S. W.**—Notes on the asilid genera Bombomima and Laphria with descriptions of three new species and two new varieties. [4] 61: 157-161, ill. ***Bromley, S. W.**—The Asilidae of Cuba. [7] 22: 272-294, ill. ***Cresson, E. T.**—Studies in the dipterous family Ephydridae. Paper II. [mostly exotic]. [1] 55: 165-195. **Curran, C. H.**—Diptera of the American Museum Congo expedition. [Bull. American Mus. Nat. Hist.] 58: 167-187, ill. ***Curran, C. H.**—New species of Scatophagidae. [4] 61: 130-134, ill. ***Dyar, H. G.**—A new species of mosquito from Montana with annotated list of the species known from the state [50] 75, Art. 23: 8pp. **Hall, D. G.**—Corrections to Sarcophaga pallinervis and related species in the Americas. [103] 2: 71. **Hallock, H. C.**—Notes on methods of rearing Sarcophaginae, and the biology of Sarcophaga latisterna. [7] 22: 246- 250, ill. **Hearle, E.**—The life history of Aedes flavescens. [Trans. R. Soc. Canada, Biol. Sc.] 23, Sec. 5: 85-102, ill. ***Huckett, H. C.**—New Canadian anthomyids belonging to the genus Hylemyia (Muscidae). [4] 61: 136-144, cont. ***Johannsen, O. A.**—A new species of Blepharocera from Massachusetts. [5] 36: 123-124. **Johnson, C. W.**—Diptera destroying snails. [5] 36: 106. ***Johnson, C. W.**—Diptera of Labrador. [5] 36: 129-146. **Kröber, O.**—Ueber einige kleinere gattungen der süd amerikanischen Tabanini. [34] 83: 115-137, ill. **Lindner, E.**—Dipterologische eindrücke aus Sudamerika. [17] 46: 25-26, cont. ***Malloch, J. R.**—Exotic Muscaridae. [Alaska and S. Am.] [75] 4: 97-120. **Martinez, M.**—La

mosca domestica en la ciudad de Mexico. [Mem. y Rev. Soc. Cien. "Antonio Alzate"] 48: 391-418, ill. **Paramonow, S. J.**—Beiträge zur monographie der gattung Bombylius (Bombyliidae). Beitrage zur monographie der gattung Exoprosopa. [Acad. Sci. Ukraïne Mem. Cl. Sci. Phys. Math.] 3: 185pp; 6: 303pp, ill. **Paramonow, S. J.**—Beiträge zur monographie einiger Bombyliiden-gattungen. [Acad. Sciences l'Ukraïne] 1929: 65-224. **Quayle, H. J.**—The mediterranean and other fruit flies. [Univ. Cal. Coll. Agric.] Circ. 315: 19pp., ill. **Rolfs, P. H.**—The Mediterranean fruit fly. [39] 13: 25-30. ***Shannon, R. C.**—Two new and remarkable Syrphidae in the Mus. Nac. Hist. Nat. Buenos Aires. [An. Mus. Nac. Hist. Nat. Bernardina Rivadavia] 34: 573-576. ***Speiser, P.**—Drei ortaliden aus Südbrasilien. [48] 46: 27-31, ill.

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HYMENOPTERA.—Balduf, W. V.—The bionomics of Tetrastichus verrucarii (Chalcidoidea) with notes on its hosts (Neuroterus spp., Cynipidae) on bur oak. [4] 61: 125-130. ***Bequaert, J.**—A new Pseudomasaris from California, with some considerations on the masarid wasps. [5] 36: 61-88, ill. ***da Costa Lima, A.**—Nota sobre o "Pseudotelenomus pachycoris" (n. g., n. sp.) parasito dos ovos de "Pachycoris torridus." (S). [32] 4: 51-53, ill. **Deay, H. O.**—The Coreidae of Kansas. [Kansas Univ. Sci. Bull.] 18: 371-415, ill. **deOng, E. R.**—The honeybee as a pollinizer. [Univ. Calif. Coll. Agric.] Circ. 297: 17-22. ***Doering, K. C.**—The genus Clastoptera in America north of Mexico. [Kansas Univ. Sci. Bull.] 18: 5-153, ill. ***Fischer, C. R.**—De um novo Hymenoptero destruidor de motucas. (S). [Bol. Biol. Rio de Janeiro] 1929: 43-46, ill. **Friese, H.**—Wie können schmarotzerbienen aus sammelbienen entstehen? [34] 84: 1-3. **Frings, C. F.**—Beobachtete paarung bei Ichneumoniden. [20] 44: 26. **Hicks, C. H.**—Pseudomasaris edwardsii, another pollen-provisioning wasp, with further notes on P. vespoides. [4] 61: 121-125. **Malyshev, S. I.**—The nesting habits of Macropis (Apoidea). [EOS] 5: 97-109, ill. ***Mitchell, T. B.**—A species of Megachile from Bermuda. [5] 36: 93-94. ***Muesebeck, C. F. W.**—Two new species of Apanteles (Braconidae). [10] 31: 118-120. ***Parker, J. B.**—A generic revision of the fossorial wasps of the tribes Stizini and Bembicini with notes and descriptions of new species. [50] 75, Art. 5: 203pp., ill. **Robertson, C.**—Phenology of oligolectic bees and favorite flowers. [5] 36: 112-118. ***Ross, H. H.**—A study of Marlatt's group I of the genus Pontania with descriptions of four new species (Tenthredinidae). [10] 31: 91-97, ill. **Schwarz, H. F.**—A gynandromorphic specimen of Trigona cupira var. rhumbleri. (S). [6] 37: 145-149. **Stäger, R.**—Die samensammelnden ameisen und das ernährungsproblem. [45] 24: 199-214. ***Timberlake, P. H.**—New records and descriptions of bees of the genus Perdita. [6] 37: 111-125. **Wheeler, W. M.**—Two neotropical ants established in the United States. [5] 36: 89-90. **Wilkinson, D. S.**—New species and host records of Braconidae. (S). [22] 20: 205-208, ill.

SPECIAL NOTICES.—Zoologica Record Vol. LXV, 1928, Part 11, Insecta, has just been issued.

EXCHANGES

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These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

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